

STATEMENT OF CONSIDERATIONS

REQUEST BY PRAXAIR, INC., FOR AN ADVANCED WAIVER OF DOMESTIC AND FOREIGN PATENT RIGHTS UNDER COOPERATIVE AGREEMENT NO. DE-FC36-00GO10534; W(A)-00-020; CH-1036

The Petitioner, Praxair, Inc. (hereinafter "Praxair"), has requested a waiver of domestic and foreign patent rights for all subject inventions arising from its participation under the above referenced cooperative agreement entitled "Integrated Ceramic Membrane System for H₂ Production." This cooperative agreement pertains to the development of a small-scale membrane-based hydrogen production system.

The objective of this cooperative agreement is to develop a cost-effective, small-scale hydrogen plant by integration of a ceramic hydrogen transport membrane (HTM) with a ceramic oxygen transport membrane (OTM) partial oxidation reactor or an air-based partial oxidation reactor. Specifically, this cooperative agreement is directed to technical feasibility analysis of the proposed system, experimental studies to support technical feasibility analysis, evaluation of the economic feasibility for the preferred process based on the experimental studies, and preparation of a defined development program based upon this analysis.

The overall estimated cost under this cooperative agreement, which is anticipated to be performed over approximately 26 months, is about \$600,000. The initial phase under this cooperative agreement will be performed at a total cost of \$299,572, of which the Petitioner's cost share is \$74,893.00, or approximately 25% cost sharing. Although the actual cost sharing for subsequent phases has yet to be negotiated, the total cost sharing, in aggregate, will not be less than 25 percent.

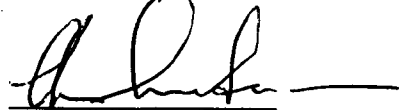
As noted in its waiver petition, Petitioner, through its predecessor Union Carbide Corporation, has a long established non-governmental, commercial position as a supplier of industrial gases, including hydrogen. Further, Praxair has significant technical expertise in hydrogen separation technology, with more than 40 years of experience in the development of these technologies, which includes cryogenic separation and polymer membrane separation. Exemplary of the Petitioner's technical expertise in the field of gas separation is an extensive patent portfolio relating to membrane gas separation technology and in particular hydrogen gas separation and purification technology. Further, the subject technology will build upon OTM technology developed by the Syngas Alliance, of which the Petitioner is a member, thereby effectively leveraging research investments from outside the company to efficiently develop new technologies. Thus, considering the Petitioner's technical expertise, established market position, and significant investment in this technology, including significant cost sharing in this cooperative agreement, it is reasonable to conclude that Petitioner will continue to further develop and commercialize the technology which may arise from this cooperative agreement.

Referring to item 10 of the waiver petition, granting this waiver is not expected to have any adverse impact on competition. The Petitioner is one of five major producers of industrial gases and has approximately a 14% share of the global market for industrial gases. The Petitioner's competitors have developed numerous systems for hydrogen gas separation, providing alternate technologies for hydrogen gas production. The Petitioner will compete with these alternate technologies and thereby, broaden the available manufacturing technology for

the production of hydrogen. The granting of this waiver and the underlying cooperative agreement can be expected to stimulate competition in the field by providing a viable alternate to existing hydrogen production technologies.

The Petitioner has agreed that this waiver will be subject to the usual government license and march-in and U.S. preference provisions, equivalent to those set out in 35 U.S.C. 202-204, as well as appropriate third party background patent and data licensing provisions. Further, Petitioner has agreed to the attached U.S. competitiveness provisions (clause (t)), wherein the Petitioner has agreed that equipment for the production of hydrogen products which embody any waived invention or equipment that is produced using any waived invention will be manufactured substantially in the United States unless Petitioner can show to the satisfaction of the DOE that it is not commercially feasible to do so, and in any event it will not license, assign or otherwise transfer any waived invention to any entity unless that entity agrees to these same requirements.

Considering the foregoing, it is believed that granting this waiver will provide Petitioner with the necessary incentive to invest its resources in the commercialization of the results of the cooperative agreement in a fashion which will make the above technology available to the public in the shortest practicable time. Therefore, upon evaluation of the waiver petition and in view of the objectives and considerations set forth in 10 CFR Part 784, all of which have been considered, it is recommended that the requested waiver be granted.



Thomas G. Anderson
Assistant Chief Counsel
Office of Intellectual
Property Law

Date: 3/9/01

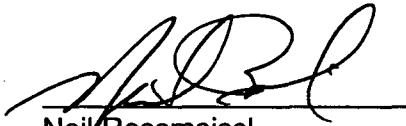


Mark LaMarre
Patent Attorney
Office of Intellectual
Property Law

Date: March 9, 2001

Based upon the foregoing Statement of Considerations and representations in the attached waiver petition, it is determined that the interests of the United States and the general public will best be served by a waiver of patent rights of the scope described above, and therefore the waiver is granted. This waiver will not apply to any substantial modification or extension of the cooperative agreement.

CONCURRENCE:

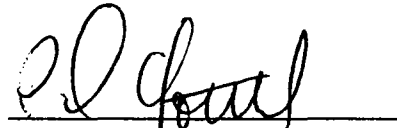


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5/29/01

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6-11-01